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## SEQUENCE LISTING

## 5 (1) GENERAL INFORMATION:

## (i) APPLICANT:

(A) NAME: ACTINOVA LIMITED  
 (B) STREET: 5 Signet Court, Swanns Road  
 (C) CITY: Cambridge  
 (E) COUNTRY: United Kingdom  
 (F) POSTAL CODE (ZIP): CB5 8LA

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(ii) TITLE OF INVENTION: IMMUNOGLOBULIN BINDING PROTEIN

15

(iii) NUMBER OF SEQUENCES: 22

## (iv) COMPUTER READABLE FORM:

(A) MEDIUM TYPE: Floppy disk  
 (B) COMPUTER: IBM PC compatible  
 (C) OPERATING SYSTEM: PC-DOS/MS-DOS  
 (D) SOFTWARE: PatentIn Release #1.0, Version #1.30 (EPO)

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## (v) CURRENT APPLICATION DATA:

APPLICATION NUMBER: GB N/A

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## (2) INFORMATION FOR SEQ ID NO: 1:

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 249 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: double  
 (D) TOPOLOGY: linear

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(ii) MOLECULE TYPE: DNA (genomic)

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## (ix) FEATURE:

(A) NAME/KEY: CDS  
 (B) LOCATION: 1..246

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## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1:

45 ATG AAC ATT AAA TTT GCT GGA AAA GAA ACA CCA GAA ACA CCA GAA GAA 48  
 Met Asn Ile Lys Phe Ala Gly Lys Glu Thr Pro Glu Thr Pro Glu Glu  
 1 5 10 15

CCA AAA GAA GAA GTT ACA ATC AAA GTT AAC TTA ATC TTT GCA GAT GGA 96  
 Pro Lys Glu Glu Val Thr Ile Lys Val Asn Leu Ile Phe Ala Asp Gly  
 20 25 30

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	AAG ATA CAA ACA GCA GAA TTC AAA GGA ACA TTT GAA GCA ACA GCA	144
	Lys Ile Gln Thr Ala Glu Phe Lys Gly Thr Phe Glu Glu Ala Thr Ala	
5	35 40 45	
	GAA GCT TAC AGA TAT GCA GAC TTA TTA GCA AAA GTA AAT GGC GAA TAT	192
	Glu Ala Tyr Arg Tyr Ala Asp Leu Leu Ala Lys Val Asn Gly Glu Tyr	
	50 55 60	
10	ACA GCA GAC TTA GAA GAT GGT GGA AAC CAT ATG AAC ATT AAA TTT GCT	240
	Thr Ala Asp Leu Glu Asp Gly Gly Asn His Met Asn Ile Lys Phe Ala	
	65 70 75 80	
15	GGA AAA TAA	249
	Gly Lys	

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 2:

30 Met Asn Ile Lys Phe Ala Gly Lys Glu Thr Pro Glu Thr Pro Glu Tyr  
1 5 10 15

Pro Lys Glu Glu Val Thr Ile Lys Val Asn Leu Ile Phe Ala Asp Gly  
20 25 30

35 Lys Ile Gln Thr Ala Glu Phe Lys Gly Thr Phe Glu Glu Ala Thr Ala  
35 40 45

Glu Ala Tyr Arg Tyr Ala Asp Leu Leu Ala Lys Val Asn Gly Glu Tyr  
40 50 55 60

Thr Ala Asp Leu Glu Asp Gly Gly Asn His Met Asn Ile Lys Phe Ala  
65 70 75 80

45 Gly Lys

50 (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 228 base pairs  
(B) TYPE: nucleic acid

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(C) STRANDEDNESS: double

(D) TOPOLOGY: linear

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(ii) MOLECULE TYPE: DNA (genomic)

(ix) FEATURE:

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(A) NAME/KEY: CDS

(B) LOCATION: 1..228

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3:

15

AAA GAA GAA ACA CCA GAA ACA CCA GAA ACT GAT TCA GAA GAA GAA GTA 48  
 Lys Glu Glu Thr Pro Glu Thr Pro Glu Thr Asp Ser Glu Glu Glu Val  
 235 240 245

20

ACA ATC AAA GCT AAC CTA ATC TTT GCA AAT GGA AGC ACA CAA ACT GCA 96  
 Thr Ile Lys Ala Asn Leu Ile Phe Ala Asn Gly Ser Thr Gln Thr Ala  
 250 255 260 265

25

GAA TTC AAA GGA ACA TTT GAA AAA GCA ACA TCA GAA GCT TAT GCG TAT 144  
 Glu Phe Lys Gly Thr Phe Glu Lys Ala Thr Ser Glu Ala Tyr Ala Tyr  
 270 275 280

30

GCA GAT ACT TTG AAG AAA GAC AAT GGA GAA TAT ACT GTA GAT GTT GCA 192  
 Ala Asp Thr Leu Lys Lys Asp Asn Gly Glu Tyr Thr Val Asp Val Ala  
 285 290 295

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GAT AAA GGT TAT ACT TTA AAT ATT AAA TTT GCT GGA 228  
 Asp Lys Gly Tyr Thr Leu Asn Ile Lys Phe Ala Gly  
 300 305

(2) INFORMATION FOR SEQ ID NO: 4:

(i) SEQUENCE CHARACTERISTICS:

40

(A) LENGTH: 76 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 4:

Lys Glu Glu Thr Pro Glu Thr Pro Glu Thr Asp Ser Glu Glu Glu Val  
 1 5 10 15

50

Thr Ile Lys Ala Asn Leu Ile Phe Ala Asn Gly Ser Thr Gln Thr Ala  
 20 25 30

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5           Glu Phe Lys Gly Thr Phe Glu Lys Ala Thr Ser Glu Ala Tyr Ala Tyr  
                   35                               40                               45

Ala Asp Thr Leu Lys Lys Asp Asn Gly Glu Tyr Thr Val Asp Val Ala  
                   50                               55                               60

10       Asp Lys Gly Tyr Thr Leu Asn Ile Lys Phe Ala Gly  
                   65                               70                               75

## (2) INFORMATION FOR SEQ ID NO: 5:

15       (i) SEQUENCE CHARACTERISTICS:  
               (A) LENGTH: 216 base pairs  
               (B) TYPE: nucleic acid  
               (C) STRANDEDNESS: double  
               (D) TOPOLOGY: linear

20       (ii) MOLECULE TYPE: DNA (genomic)

25       (ix) FEATURE:  
               (A) NAME/KEY: CDS  
               (B) LOCATION:1..216

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 5:

30       AAA GAA AAA ACA CCA GAA GAA CCA AAA GAA GAA GTT ACT ATT AAA GCA           48  
           Lys Glu Lys Thr Pro Glu Glu Pro Lys Glu Glu Val Thr Ile Lys Ala  
                   80                               85                               90

35       AAC TTA ATC TAT GCA GAT GGA AAA ACA CAA ACA GCA GAA TTC AAA GGA           96  
           Asn Leu Ile Tyr Ala Asp Gly Lys Thr Gln Thr Ala Glu Phe Lys Gly  
                   95                               100                               105

40       ACA TTT GAA GAA GCA ACA GCA GAA GCA TAC AGA TAT GCA GAT GCA TTA           144  
           Thr Phe Glu Glu Ala Thr Ala Glu Ala Tyr Arg Tyr Ala Asp Ala Leu  
                   110                               115                               120

45       AAG AAG GAC AAT GGA GAA TAT ACA GTA GAC GTT GCA GAT AAA GGT TAT           192  
           Lys Lys Asp Asn Gly Glu Tyr Thr Val Asp Val Ala Asp Lys Gly Tyr  
                   125                               130                               135                               140

50       ACT TTA AAT ATT AAA TTT GCT GGA           216  
           Thr Leu Asn Ile Lys Phe Ala Gly  
                   145

## (2) INFORMATION FOR SEQ ID NO: 6:

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## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 72 amino acids  
 (B) TYPE: amino acid  
 (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: protein

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 6:

Lys Glu Lys Thr Pro Glu Glu Pro Lys Glu Glu Val Thr Ile Lys Ala  
 1 5 10 15  
 Asn Leu Ile Tyr Ala Asp Gly Lys Thr Gln Thr Ala Glu Phe Lys Gly  
 20 25 30  
 Thr Phe Glu Glu Ala Thr Ala Glu Ala Tyr Arg Tyr Ala Asp Ala Leu  
 35 40 45  
 Lys Lys Asp Asn Gly Glu Tyr Thr Val Asp Val Ala Asp Lys Gly Tyr  
 50 55 60  
 Thr Leu Asn Ile Lys Phe Ala Gly  
 65 70

## (2) INFORMATION FOR SEQ ID NO: 7:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 216 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (genomic)

## (ix) FEATURE:

- (A) NAME/KEY: CDS  
 (B) LOCATION: 1..216

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 7:

AAA GAA AAA ACA CCA GAA GAA CCA AAA GAA GAA GTT ACT ATT AAA GCA  
 Lys Glu Lys Thr Pro Glu Glu Pro Lys Glu Glu Val Thr Ile Lys Ala  
 75 80 85  
 AAC TTA ATC TAT GCA GAT GGA AAA ACA CAA ACA GCA GAA TTC AAA GGA  
 Asn Leu Ile Tyr Ala Asp Gly Lys Thr Gln Thr Ala Glu Phe Lys Gly  
 90 95 100

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5 ACA TTT GAA GAA GCA ACA GCA GAA GCA TAC AGA TAT GCT GAC TTA TTA 144  
 Thr Phe Glu Glu Ala Thr Ala Glu Ala Tyr Arg Tyr Ala Asp Leu Leu  
 105 110 115 120

10 GCA AAA GAA AAT GGT AAA TAT ACA GTA GAC GTT GCA GAT AAA GGT TAT 192  
 Ala Lys Glu Asn Gly Lys Tyr Thr Val Asp Val Ala Asp Lys Gly Tyr  
 125 130 135

15 ACT TTA AAT ATT AAA TTT GCT GGA 216  
 Thr Leu Asn Ile Lys Phe Ala Gly  
 140

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(2) INFORMATION FOR SEQ ID NO: 8:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 72 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

20

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 8:

25

Lys Glu Lys Thr Pro Glu Glu Pro Lys Glu Glu Val Thr Ile Lys Ala  
 1 5 10 15

30

Asn Leu Ile Tyr Ala Asp Gly Lys Thr Gln Thr Ala Glu Phe Lys Gly  
 20 25 30

Thr Phe Glu Glu Ala Thr Ala Glu Ala Tyr Arg Tyr Ala Asp Leu Leu  
 35 40 45

35

Ala Lys Glu Asn Gly Lys Tyr Thr Val Asp Val Ala Asp Lys Gly Tyr  
 50 55 60

40

Thr Leu Asn Ile Lys Phe Ala Gly  
 65 70

(2) INFORMATION FOR SEQ ID NO: 9:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 216 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

45

(ii) MOLECULE TYPE: DNA (genomic)

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(ix) FEATURE:

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(A) NAME/KEY: CDS  
(B) LOCATION: 1..216

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 9:

10 AAA GAA AAA ACA CCA GAA GAA CCA AAA GAA GAA GTT ACT ATT AAA GCA 48  
Lys Glu Lys Thr Pro Glu Glu Pro Lys Glu Glu Val Thr Ile Lys Ala  
75 80 85

15 AAC TTA ATC TAT GCA GAT GGA AAA ACT CAA ACA GCA GAG TTC AAA GGA 96  
Asn Leu Ile Tyr Ala Asp Gly Lys Thr Gln Thr Ala Glu Phe Lys Gly  
90 95 100

20 ACA TTT GCA GAA GCA ACA GCA GAA GCA TAC AGA TAC GCT GAC TTA TTA 144  
Thr Phe Ala Glu Ala Thr Ala Glu Ala Tyr Arg Tyr Ala Asp Leu Leu  
105 110 115 120

GCA AAA GAA AAT GGT AAA TAT ACA GCA GAC TTA GAA GAT GGT GGA TAC 192  
Ala Lys Glu Asn Gly Lys Tyr Thr Ala Asp Leu Glu Asp Gly Gly Tyr  
125 130 135

25 ACT ATT AAT ATT AGA TTT GCA GGT 216  
Thr Ile Asn Ile Arg Phe Ala Gly  
140

(2) INFORMATION FOR SEQ ID NO: 10:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 72 amino acids  
(B) TYPE: amino acid  
(D) TOPOLOGY: linear

35

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 10:

40 Lys Glu Lys Thr Pro Glu Glu Pro Lys Glu Glu Val Thr Ile Lys Ala  
1 5 10 15

Asn Leu Ile Tyr Ala Asp Gly Lys Thr Gln Thr Ala Glu Phe Lys Gly  
20 25 30

45 Thr Phe Ala Glu Ala Thr Ala Glu Ala Tyr Arg Tyr Ala Asp Leu Leu  
35 40 45

50 Ala Lys Glu Asn Gly Lys Tyr Thr Ala Asp Leu Glu Asp Gly Gly Tyr  
50 55 60

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Thr Ile Asn Ile Arg Phe Ala Gly  
65 70

## (2) INFORMATION FOR SEQ ID NO: 11:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 213 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: double  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (genomic)

## (ix) FEATURE:

- (A) NAME/KEY: CDS  
(B) LOCATION: 1..213

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 11:

AAA GAA ACA CCA GAA CCA GAA GAA GAA GTT ACA ATC AAA GCT AAC TTA 48  
Lys Glu Thr Pro Glu Pro Glu Glu Glu Val Thr Ile Lys Ala Asn Leu  
75 80 85

ATC TTT GCA GAT GGA AGC ACA CAA AAT GCA GAA TTC AAA GGA ACA TTC 96  
Ile Phe Ala Asp Gly Ser Thr Gln Asn Ala Glu Phe Lys Gly Thr Phe  
90 95 100

GCA AAA GCA GTA TCA GAT GCT TAC GCT TAC GCA GAT GCT TTA AAG AAA 144  
Ala Lys Ala Val Ser Asp Ala Tyr Ala Tyr Ala Asp Ala Leu Lys Lys  
105 110 115 120

GAC AAC GGA GAA TAT ACT GTA GAC GTT GCA GAT AAA GGC TTA ACT TTA 192  
Asp Asn Gly Glu Tyr Thr Val Asp Val Ala Asp Lys Gly Leu Thr Leu  
125 130 135

AAT ATT AAA TTC GCT GGT AAA 213  
Asn Ile Lys Phe Ala Gly Lys  
140

## (2) INFORMATION FOR SEQ ID NO: 12:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 71 amino acids  
(B) TYPE: amino acid  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: protein



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## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 12:

5 Lys Glu Thr Pro Glu Pro Glu Glu Glu Val Thr Ile Lys Ala Asn Leu  
 1 5 10 15  
 Ile Phe Ala Asp Gly Ser Thr Gln Asn Ala Glu Phe Lys Gly Thr Phe  
 20 25 30  
 10 Ala Lys Ala Val Ser Asp Ala Tyr Ala Tyr Ala Asp Ala Leu Lys Lys  
 35 40 45  
 15 Asp Asn Gly Glu Tyr Thr Val Asp Val Ala Asp Lys Gly Leu Thr Leu  
 50 55 60  
 Asn Ile Lys Phe Ala Gly Lys  
 65 70  
 20

## (2) INFORMATION FOR SEQ ID NO: 13:

## (i) SEQUENCE CHARACTERISTICS:

25 (A) LENGTH: 213 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: double  
 (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (genomic)

## (ix) FEATURE:

(A) NAME/KEY: CDS  
 (B) LOCATION: 1..213  
 35

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 13:

AAA GAA AAA CCA GAA GAA CCA AAA GAA GAA GTT ACA ATC AAA GTT AAC 48  
 40 Lys Glu Lys Pro Glu Glu Pro Lys Glu Glu Val Thr Ile Lys Val Asn  
 75 80 85  
 TTA ATC TTT GCA GAT GGA AAG ACA CAA ACA GCA GAA TTC AAA GGA ACA 96  
 45 Leu Ile Phe Ala Asp Gly Lys Thr Gln Thr Ala Glu Phe Lys Gly Thr  
 90 95 100  
 TTT GAA GAA GCA ACA GCA AAA GCT TAT GCT TAT GCA GAC TTA TTA GCA 144  
 Phe Glu Glu Ala Thr Ala Lys Ala Tyr Ala Tyr Ala Asp Leu Leu Ala  
 105 110 115  
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5 AAA GAA AAT GGC GAA TAT ACA GCA GAC TTA GAA GAT GGT GGA AAC ACA 192  
 Lys Glu Asn Gly Glu Tyr Thr Ala Asp Leu Glu Asp Gly Gly Asn Thr  
 120 125 130 135

10 ATC AAC ATT AAA TTT GCT GGA 213  
 Ile Asn Ile Lys Phe Ala Gly  
 140

## (2) INFORMATION FOR SEQ ID NO: 14:

## (i) SEQUENCE CHARACTERISTICS:

- 15 (A) LENGTH: 71 amino acids  
 (B) TYPE: amino acid  
 (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: protein

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 14:

20 Lys Glu Lys Pro Glu Glu Pro Lys Glu Glu Val Thr Ile Lys Val Asn  
 1 5 10 15

25 Leu Ile Phe Ala Asp Gly Lys Thr Gln Thr Ala Glu Phe Lys Gly Thr  
 20 25 30

Phe Glu Glu Ala Thr Ala Lys Ala Tyr Ala Tyr Ala Asp Leu Leu Ala  
 35 40 45

30 Lys Glu Asn Gly Glu Tyr Thr Ala Asp Leu Glu Asp Gly Gly Asn Thr  
 50 55 60

35 Ile Asn Ile Lys Phe Ala Gly  
 65 70

## (2) INFORMATION FOR SEQ ID NO: 15:

## (i) SEQUENCE CHARACTERISTICS:

- 40 (A) LENGTH: 222 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: double  
 (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (genomic)

## (ix) FEATURE:

- 50 (A) NAME/KEY: CDS  
 (B) LOCATION: 1..222

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## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 15:

5    AAA GAA ACA CCA GAA ACA CCA GAA GAA CCA AAA GAA GAA GTT ACA ATC    48  
      Lys Glu Thr Pro Glu Thr Pro Glu Glu Pro Lys Glu Glu Val Thr Ile  
                              75                                80                                85

10    AAA GTT AAC TTA ATC TTT GCA GAT GGA AAG ATA CAA ACA GCA GAA TTC    96  
      Lys Val Asn Leu Ile Phe Ala Asp Gly Lys Ile Gln Thr Ala Glu Phe  
                              90                                95                                100

15    AAA GGA ACA TTT GAA GAA GCA ACA GCA AAA GCT TAT GCT TAT GCA AAC    144  
      Lys Gly Thr Phe Glu Glu Ala Thr Ala Lys Ala Tyr Ala Tyr Ala Asn  
                              105                                110                                115

20    TTA TTA GCA AAA GAA AAT GGC GAA TAT ACA GCA GAC TTA GAA GAT GGT    192  
      Leu Leu Ala Lys Glu Asn Gly Glu Tyr Thr Ala Asp Leu Glu Asp Gly  
                              120                                125                                130                                135

25    GGA AAC ACA ATC AAC ATT AAA TTT GCT GGA    222  
      Gly Asn Thr Ile Asn Ile Lys Phe Ala Gly  
                              140                                145

## (2) INFORMATION FOR SEQ ID NO: 16:

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 74 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 16:

35    Lys Glu Thr Pro Glu Thr Pro Glu Glu Pro Lys Glu Glu Val Thr Ile  
      1                                5                                10                                15

40    Lys Val Asn Leu Ile Phe Ala Asp Gly Lys Ile Gln Thr Ala Glu Phe  
                              20                                25                                30

45    Lys Gly Thr Phe Glu Glu Ala Thr Ala Lys Ala Tyr Ala Tyr Ala Asn  
                              35                                40                                45

50    Leu Leu Ala Lys Glu Asn Gly Glu Tyr Thr Ala Asp Leu Glu Asp Gly  
                              50                                55                                60

55    Gly Asn Thr Ile Asn Ile Lys Phe Ala Gly  
      65                                70

## (2) INFORMATION FOR SEQ ID NO: 17:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 225 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: double  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(ix) FEATURE:

- (A) NAME/KEY: CDS  
(B) LOCATION: 1..225

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 17:

AAA GAA ACA CCA GAA ACA CCA GAA GAA CCA AAA GAA GAA GTT ACA ATC 48  
Lys Glu Thr Pro Glu Thr Pro Glu Glu Pro Lys Glu Glu Val Thr Ile  
75 80 85 90

AAA GTT AAC TTA ATC TTT GCA GAT GGA AAA ACA CAA ACA GCA GAA TTC 96  
Lys Val Asn Leu Ile Phe Ala Asp Gly Lys Thr Gln Thr Ala Glu Phe  
95 100 105

AAA GGA ACA TTT GAA GAA GCA ACA GCA GAA GCT TAC AGA TAT GCA GAC 144  
Lys Gly Thr Phe Glu Glu Ala Thr Ala Glu Ala Tyr Arg Tyr Ala Asp  
110 115 120

TTA TTA GCA AAA GTA AAT GGT GAA TAC ACA GCA GAC TTA GAA GAT GGC 192  
Leu Leu Ala Lys Val Asn Gly Glu Tyr Thr Ala Asp Leu Glu Asp Gly  
125 130 135

GGA TAC ACT ATC AAC ATC AAA TTT GCT GGA AAA 225  
Gly Tyr Thr Ile Asn Ile Lys Phe Ala Gly Lys  
140 145

(2) INFORMATION FOR SEQ ID NO: 18:

(1) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 75 amino acids  
(B) TYPE: amino acid  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 18:

Lys Glu Thr Pro Glu Thr Pro Glu Glu Pro Lys Glu Glu Val Thr Ile  
1 5 10 15

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Lys Val Asn Leu Ile Phe Ala Asp Gly Lys Thr Gln Thr Ala Glu Phe  
 20 25 30  
 5  
 Lys Gly Thr Phe Glu Glu Ala Thr Ala Glu Ala Tyr Arg Tyr Ala Asp  
 35 40 45  
 10  
 Leu Leu Ala Lys Val Asn Gly Glu Tyr Thr Ala Asp Leu Glu Asp Gly  
 50 55 60  
 Gly Tyr Thr Ile Asn Ile Lys Phe Ala Gly Lys  
 65 70 75  
 15

## (2) INFORMATION FOR SEQ ID NO: 19:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 249 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: double  
 (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (genomic)

## (ix) FEATURE:

- (A) NAME/KEY: CDS  
 (B) LOCATION: 1..246

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 19:

ATG AAC ATT AAA TTT GCT GGA AAA GAA ACA CCA GAA ACA CCA GAA GAA 48  
 35 Met Asn Ile Lys Phe Ala Gly Lys Glu Thr Pro Glu Thr Pro Glu Glu  
 1 5 10 15  
 CCA AAA GAA GAA GTT ACA ATC AAA GTT AAC TTA ATC TTT GCA GAT GGA 96  
 40 Pro Lys Glu Glu Val Thr Ile Lys Val Asn Leu Ile Phe Ala Asp Gly  
 20 25 30  
 AAG ATA CAA ACA GCA GAA CAT AAA GGA ACA TTT GAA GAA GCA ACA GCA 144  
 Lys Ile Gln Thr Ala Glu His Lys Gly Thr Phe Glu Glu Ala Thr Ala  
 35 40 45  
 45 GAA GCT TAC AGA TAT GCA GAC TTA TTA GCA AAA GTA AAT GGC GAA TAT 192  
 Glu Ala Tyr Arg Tyr Ala Asp Leu Leu Ala Lys Val Asn Gly Glu Tyr  
 50 55 60  
 50 ACA GCA GAC TTA GAA GAT GGT GGA AAC CAT ATG AAC ATT AAA TTT GCT 240  
 Thr Ala Asp Leu Glu Asp Gly Gly Asn His Met Asn Ile Lys Phe Ala  
 65 70 75 80

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GGA AAA TAA  
Gly Lys

249

5

(2) INFORMATION FOR SEQ ID NO: 20:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 249 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: double  
(D) TOPOLOGY: linear

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(ii) MOLECULE TYPE: DNA (genomic)

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(ix) FEATURE:

- (A) NAME/KEY: CDS  
(B) LOCATION: 1..246

20

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 20:

ATG AAC ATT AAA TTT GCT GGA AAA GAA ACA CCA GAA ACA CCA GAA GAA 48  
Met Asn Ile Lys Phe Ala Gly Lys Glu Thr Pro Glu Thr Pro Glu Glu  
1 5 10 15

25

CCA AAA GAA GAA GTT ACA ATC AAA GTT AAC TTA ATC TTT GCA GAT GGA 96  
Pro Lys Glu Glu Val Thr Ile Lys Val Asn Leu Ile Phe Ala Asp Gly  
20 25 30

30

AAG ATA CAA ACA GCA GAA TTC AAA GGA ACA TTT GAA GAA GCA ACA GCA 144  
Lys Ile Gln Thr Ala Glu Phe Lys Gly Thr Phe Glu Glu Ala Thr Ala  
35 40 45

35

GAA GCT TAC AGA AAC GCA GAC TTA TTA GCA AAA GTA AAT GGC GAA TAT 192  
Glu Ala Tyr Arg Phe Ala Asp Leu Leu Ala Lys Val Asn Gly Glu Tyr  
50 55 60

ACA GCA GAC TTA GAA GAT GGT GGA AAC CAT ATG AAC ATT AAA TTT GCT 240  
Thr Ala Asp Leu Glu Asp Gly Gly Asn His Met Asn Ile Lys Phe Ala  
65 70 75 80

40

GGA AAA TAA 249  
Gly Lys

45

(2) INFORMATION FOR SEQ ID NO: 21:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 249 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: double

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(D) TOPOLOGY: linear

5 (ii) MOLECULE TYPE: DNA (genomic)

(ix) FEATURE:

10 (A) NAME/KEY: CDS  
(B) LOCATION:1..246

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 21:

15 ATG AAC ATT AAA TTT GCT GGA AAA GAA ACA CCA GAA ACA CCA GAA GAA 48  
Met Asn Ile Lys Phe Ala Gly Lys Glu Thr Pro Glu Thr Pro Glu Glu  
1 5 10 15

20 CCA AAA GAA GAA GTT ACA ATC AAA GTT AAC TTA ATC TTT GCA GAT GGA 96  
Pro Lys Glu Glu Val Thr Ile Lys Val Asn Leu Ile Phe Ala Asp Gly  
20 25 30

25 AAG ATA CAA ACA GCA GAA TTC AAA GGA ACA TTT GAA GAA GCA ACA GCA 144  
Lys Ile Gln Thr Ala Glu Phe Lys Gly Thr Phe Glu Glu Ala Thr Ala  
35 40 45

30 GAA GCT TAC AGA TAT GCA GAC TTA GAC GCA AAA GTA AAT GGC GAA TGG 192  
Glu Ala Tyr Arg Tyr Ala Asp Leu Asp Ala Lys Val Asn Gly Glu Trp  
50 55 60

ACA GCA GAC TTA GAA GAT GGT GGA AAC CAT ATG AAC ATT AAA TTT GCT 240  
Thr Ala Asp Leu Glu Asp Gly Gly Asn His Met Asn Ile Lys Phe Ala  
65 70 75 80

35 GGA AAA TAA 249  
Gly Lys

(2) INFORMATION FOR SEQ ID NO: 22:

40 (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 249 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: double  
(D) TOPOLOGY: linear

45 (ii) MOLECULE TYPE: DNA (genomic)

50 (ix) FEATURE:  
(A) NAME/KEY: CDS  
(B) LOCATION:1..246

16/16

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 22:

5	ATG AAC ATT AAA TTT GCT GGA AAA GAA ACA CCA GAA ACA CCA GAA GAA	48
	Met Asn Ile Lys Phe Ala Gly Lys Glu Thr Pro Glu Thr Pro Glu Glu	
	1 5 10 15	
10	CCA AAA GAA GAA GTT ACA ATC AAA GTT AAC TTA ATC TTT GCA GAT GGA	96 —
	Pro Lys Glu Glu Val Thr Ile Lys Val Asn Leu Ile Phe Ala Asp Gly	
	20 25 30	
15	AAG ATA CAA ACA GCA GAA TTC AAA GGA ACA TTT GAA GAA GCA ACA GCA	144
	Lys Ile Gln Thr Ala Glu Phe Lys Gly Thr Phe Glu Glu Ala Thr Ala	
	35 40 45	
20	GAA GCT TAC AGA TAT GCA GAC TTA CAT GCA AAA GTA AAT GGC GAA TAT	192
	Glu Ala Tyr Arg Tyr Ala Asp Leu His Ala Lys Val Asn Gly Glu Tyr	
	50 55 60	
25	ACA GCA GAC TTA GAA GAT GGT GGA AAC CAT ATG AAC ATT AAA TTT GCT	240
	Thr Ala Asp Leu Glu Asp Gly Gly Asn His Met Asn Ile Lys Phe Ala	
	65 70 75 80	
30	GGA AAA TAA	249
	Gly Lys	